

Quality Assurance Plan for Vertical Francis Turbine of RHEP

SJVN Shimla	Manufacturer Name & Address BHARAT HEAVY ELECTRICALS LTD, BHOPAL		Manufacturing Quality Plan					Project: Rampur Hydro Electric Project (6×68.67 MW)				
			Item:- Vertical Francis Turbine & Governor		QP No: QA/HT/619 Rev. No.01 Dated 13.01.2009 Page No. 1 of 9			Ref. No.SJVN/ECD/RHEP/08.2003 Dated 16.09.08 Supplier : BHEL, Bhopal				
Sl. No.	Component & Operation	Characteristics	Class	Type of Check	Quantum of Check	Reference Document	Acceptance Norms	Format Of Record	Agency M C S			Remarks
1	2	3	4	5	6	7	8	9	10			11
1.	Incoming Material											
1.1	Castings of Runner Crown, Blades & Band, Shaft Forging	Chemical Composition	Major	Test	Each Piece	DRG	DRG	TC	P	V	V	
		Mech. Properties	Major	Test	Each Piece	DRG	DRG	TC	P	V	V	
		NDT	Major	NDT	100%	DRG	DRG	TC	P	V	V	
		Dimensions	Major	Measure	100%	DRG	DRG	TC	P	V	V	
		Heat Treatment	Major	Visual	100%	DRG	DRG	TC	P	V	V	
1.2	Guide Vane Casting	Chemical Composition	Major	Test	Sample	DRG	DRG	TC	P	V	V	
		Mech Properties	Major	Test	Sample	DRG	DRG	TC	P	V	V	
		NDT	Major	NDT	100%	DRG	DRG	TC	P	V	V	
		Dimensions	Major	Measure	100%	DRG	DRG	TC	P	V	V	
		Heat Treatment	Major	Visual	100%	DRG	DRG	TC	P	V	V	
1.3	Plate Material of more than 25 mm thickness for: GV Servo Cylinder(if fabricated in house), Pressure Oil Tank, Spiral Casing and Stay Ring (Top & Bottom Plates only)	Chemical Composition	Major	Test	Sample	DRG	DRG	TC	P	V	V	
		Mech. Properties	Major	Test	Sample	DRG	DRG	TC	P	V	V	
		Plate Thickness	Major	Test	100%	DRG	DRG	TC	P	V	V	
		UT	Major	UT	100%	DRG	DRG	TC	P	V	V	



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1.4	Plate Material of more than 25 mm thickness for:	Chemical Composition	Major	Test	Sample	DRG	DRG	TC	P	V	V	
	Upper & Lower Labyrinth (Rotating & Stationary)		Major	Test	Sample	DRG	DRG	TC	P	V	V	
	Shaft Sleeve	Mech. Properties										
	Upper Turbine Cover/Head Cover	Plate Thickness	Major	Test	100%	DRG	DRG	TC	P	V	V	
	Lower Turbine Cover/Pivot Ring											
	Draft Tube Cone (Upper & Lower Sections)	UT	Major	UT	100%	DRG	DRG	TC	P	V	V	
Regulating Ring												
	Guide Vane, Servo Motor Body, Piston (If fabricated in house)											
1.5	Plate Material of:	Chemical Composition	Major	Test	Sample	DRG	DRG	TC	P	V	V	
	Check Plates (Upper & Lower)		Major	Test	Sample	DRG	DRG	TC	P	V	V	
		Mech. Properties										
		Thickness	Major	Test	Sample	DRG	DRG	TC	P	V	V	

QUALITY ASSURANCE

BPP

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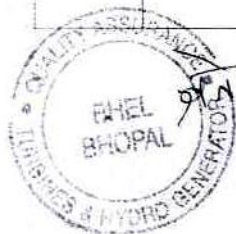
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2.6	Guide Bearing Pads	UT (Bond check)	Major	UT	100%	DRG	DRG	QCR	P	V	W/V	CHP For 20% in each unit
		Final Main Dimensions	Major	Measure	100%	DRG	DRG	QCR	P	V	W/V	CHP For 20% in each unit
2.7	Spiral Casing	WPS, PQR, Welders Qualification Records	Major	---	100%	DRG/ASME	DRG/ASME	ASME Format	P	V	V	
		NDT as per DRG	Major	NDT	100%	DRG	DRG	QCR	P	V	W/V	CHP For 20% in each unit
		Stress Relieving, if applicable	Major	---	100%	Drg	Drg	SR Chart	P	V	V	
		Final Main Dimensions on Layout & Checking with dummy stay ring	Major	Measure	100%	DRG	DRG	QCR	P	V	W/V	CHP For 20% in each unit
2.8	Upper & lower Labyrinth (Rotating)	WPS,PQR & Welders Qualification Records	Major	---	100%	DRG/ASME Sec IX	DRG/ASME Sec IX	ASME Format			V	
		NDT as per DRG	Major	NDT	100%	Drg	Drg	QCR	P	V	W/V	CHP For 20% in each unit
		Final Dimensions (along with Runner)	Major	Measure	100%	Drg	Drg	QCR	P	V	W	CHP for all 6 Units
		Stress Relieving	Major	-----	100%	Drg	Drg	SR Chart	P	V	V	



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3	Assembly Inspection											
3.1	Guide Apparatus Assembly (Without Servomotor)	Guide Vane Opening at full open position of Regulating Ring	Major	Measure	100%	DRG	DRG	QCR	P	V	W	CHP for all 6 Units
		Guide Vane top and bottom clearances with top cover and pivot ring	Major	Measure	100%	DRG	DRG	QCR	P	V	W	CHP for All 6 Units
		Clearance between bedding faces of guide vanes in closed position	Major	Measure	100%	DRG	DRG	QCR	P	V	W	CHP for All 6 Units
3.2	Pressure pumping set for Turbine Governor and MIV	Operational Test <i>QA BHEL</i> <i>VENDOR'S WORKS</i>	Major	Test	100%	DRG	DRG	QCR	P	V	W/ V	CHP for 1 st Unit
3.3	Governor	Operational Test of Hydro Mech Cabinet at Bhopal Works	Major	Test	100%	DRG	DRG	QCR	P	V	W/ V	CHP for 1 st two Units.
		Operational Test of Electronic Cabinet at Bangalore Works	Major	Test	100%	DRG	DRG	QCR	P	V	W/ V	CHP for 1 st two Units
3.4	Guide Vane Servomotor	Hyd Pr Test & Operational Test of Final Assembly	Major	Test	100%	DRG	DRG	QCR	P	V	W	CHP for All 6 Units
4	Painting & Preservation for : Upper Turbine Cover, Pivot Ring, Draft Tube Cone, Pressure Oil Tank, Regulating Ring	Paint Thickness	Major	Test	100%	DRG	DRG	QCR	P	V	W/ V	CHP for 1 st Unit
		Adhesion Test	Major	Test	100%	DRG	DRG	QCR	P	V	W/ V	CHP for 1 st Unit
Manufacturer/ Contract/ Sub- Contractor Signature Manufacturer- <i>BRAJESH AGRAWAL</i> Contractor- <i>DGM- QGX, BHEL, BHOPAL</i>			Legend M : Manufacturer C : CONTRACTOR/BHEL/BHEL APPROVED AGENCY S : SJVN "P" Perform "W" witness and "V" verification			For SJVN Use Reviewed By: <i>[Signature]</i> Date: <i>14/1/09</i>		DOC NO. Name & Sign of Approving Authority & Seal: <i>R.K. BANSAI</i> <i>14/1/09</i> <i>R.K. BANSAI</i> <i>GM (QA)</i>				

Note- CHP in respect of NDT is valid only for UT/RT



BRAJESH AGRAWAL
(B. AGRAWAL)
DGM - QGX

R.K. JAIN
(R.K. JAIN)
AGM - QGX

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(N.S. RAGHUVANSHI)
SR. DGM - WTM

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AGM - HTE

